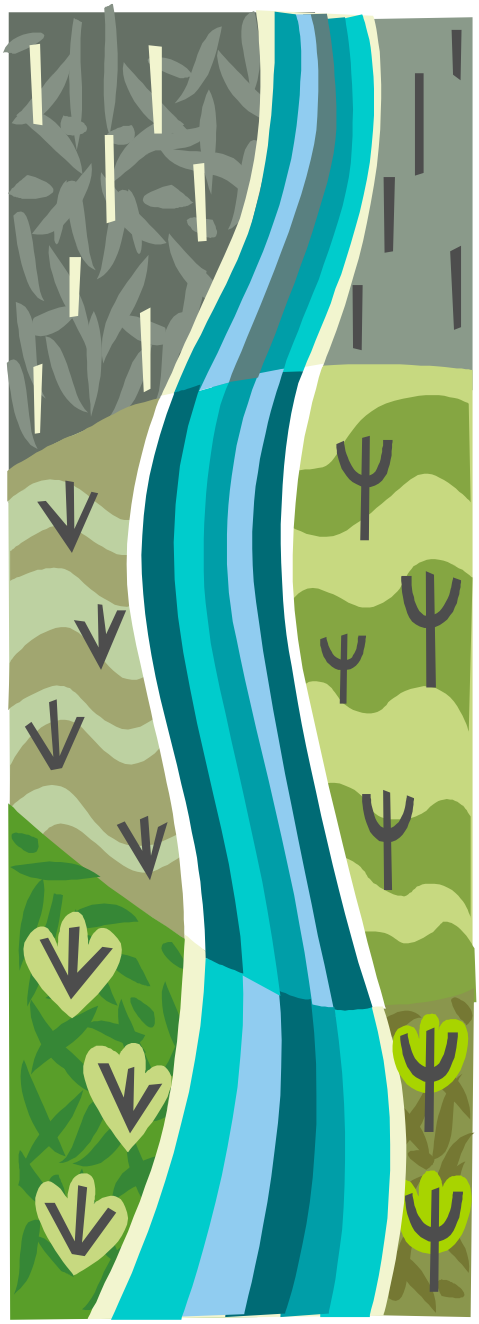
Nature's Water Recycling Program and How People Change It

Introduction



The previous activities were designed to be conducted prior to a stream visit. The purpose is to help students develop an understanding of the natural water cycle and how people change it.

It is not essential that your group carry out any of these activities before a stream visit. You may choose to go directly to the streamside activities. However, it is recommended that you review the following written materials before conducting any of the outdoor activities:

- How Nature Recycles Water
- Where Does the Rain Go?
- Too Much of a Good Thing

This information is essential for understanding the importance of streamside and community activities.

If your group is unable to participate in streamside activities, the exercises in Part II and IV provide options that do not require a stream visit.

The directions for these activities are suggested ways of carrying out the exercises. Feel free to expand and elaborate if you have the resources.

Be sure to engage the students in your group in discussions about how these activities relate to the particular watershed of your stream. Help them make the connections.

Most importantly, ***HAVE FUN***!

Activity 3: Water Cycle Theater

Goal

- ❖ To describe the movement of water through it's natural cycle.

Voluntary State Curriculum

1.0 Skill and Processes
- A Scientific Inquiry: 1, 9
- B Critical Thinking: 5

6.0 Environmental Science
- C Natural Resources & Human Needs: 1

Time 60 Minutes

Materials

- ✓ Paper and Pencils
- ✓ Your imagination
- ✓ Water Cycle Theater Activity Sheet
- ✓ "How Nature Recycles Water"

Motivation

Read, "How Nature Recycles Water"

Procedure

1. Have the students read "How Nature Recycles Water" and talk about the water cycle. Make sure the terms are understood.

2. Lead the group in brainstorming how they might represent the water cycle in a play. Work with them to write and act out their own play. You can make this as simple or elaborate as you want (e.g., design and make costumes or create placards saying what each actor represents).

3. Have students color and/or label the parts of the cycle on the diagram on the activity sheet.

Vocabulary

Condensation – the process of water vapor in the air changing into a liquid or solid.

Evaporation – when liquid water turns into a vapor or gas.

Precipitation - when water molecules fall to the ground in the form of rain, sleet or snow.

Groundwater - water that flows or seeps through the soil and saturates soil or rock, supplying springs and wells.

Infiltration – the flow of water from the land into the ground.

Runoff – the water which is not absorbed by the land and which flows directly into streams or other bodies of water.

If there is not enough time to write the play, or if the group cannot come up with an idea, use or adapt the script on the following page.

Wrap Up

- Where does the water we use come from? (Groundwater, rain, the whole cycle)
- When it rains, is the rain that falls new water? (No, part of the cycle)

Modifications

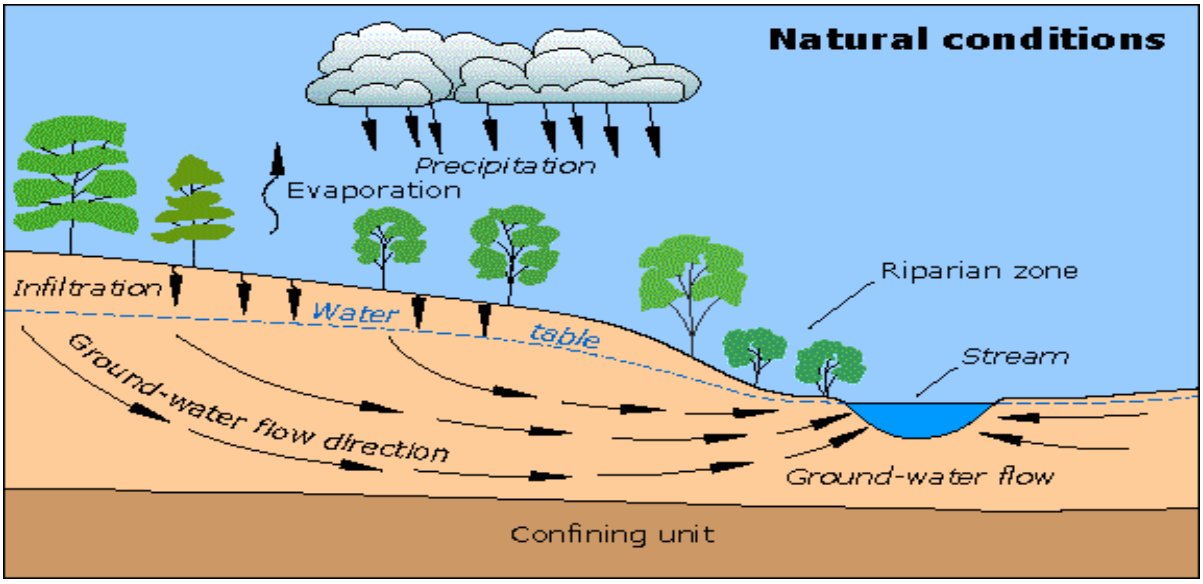
- Color Worksheet
- Help prepare for the play

Assessment

- Completed worksheet.
- Participation in play and discussion.

Optional Challenges/Extensions

- Modify play to include alternative scenarios.
- Journaling
- After learning about pollution and erosion, adapt the drama to incorporate these concepts (e.g. have the water molecules pick up and carry symbols of pollution as they pass over towns or carry symbols of pesticides and sediment as they flow over farms and construction sites).
- Project Wet Activities: Imagine, The Incredible Journey, Just Passing Through, Poetic Precipitation, The Rainstick, Stream Sense, The Thunderstorm, Water Match, Water Models, Where are the Frogs?
- Healthy Water, Healthy People Activities: Pollution-Take it or Leave it, A Snapshot in Time, From H to OH!



Water Cycle Theater Skit

What You Will Need

☐ Paper and Pencils
☐ Your imagination

Know the Meaning…

Condensation –
the process of water vapor in the air moving closer together and turning into liquid water.

Evaporation – when liquid water turns into a vapor.

Precipitation –
when water molecules fall to the ground in the form of rain, sleet or snow.

Groundwater - water that flows or seeps through the soil and saturates soil or rock, supplying springs and wells.

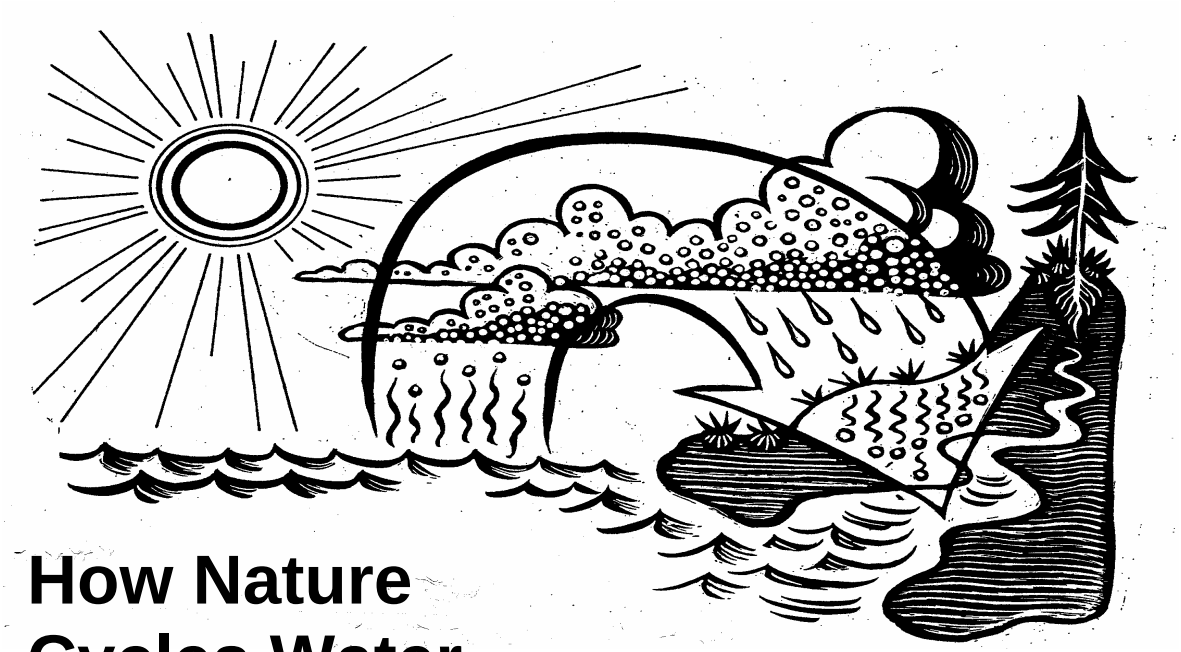
Infiltration - flow of water from the land into the ground.

Runoff – water that hits hard surfaces (concrete asphalt, roofs), is not absorbed into the soil and runs quickly downhill into a stream.

What To Do

Read "How Nature Recycles Water" and then try being a playwright. Write a play that shows how the water cycle works in a natural setting (Your teacher or leader has a sample script if you need some ideas). Decide what parts people will need to play to act out the cycle. A water molecule is made of two hydrogen atoms and one oxygen atom. You might have several groups of three people each be water molecules. Other people can be mountains and bodies of water. Decide who will play each part. Write a script for a narrator to read while the actors play their parts. Decide if you will have costumes or just use your imagination. BE CREATIVE!

After the play, talk about the water cycle. Does it make sense to you? Why is it important to the earth? To people?



How Nature Cycles Water

Water is essential for life on earth, yet we often take it for granted. Under natural conditions, water goes through certain “recycling” steps. As the water recycles it is cleaned and made healthy for plants and animals. The steps of the recycling process are:

Evaporation occurs off of any body of water. Water on the surface of a lake, river or stream is taken up into the air in tiny particles or molecules. The water changes from a liquid form to a gas. An example of this would be a puddle after the rain that disappears on a hot sunny day.

Condensation in the atmosphere happens when more and more molecules of water rise and hit colder parts of the air. The gas then turns into liquid again. Clouds are molecules of water that are not yet close enough together to be pulled to Earth by gravity. Often condensation happens early in the morning in the form of dew that forms on grass and plants.

Precipitation occurs when the condensed water falls to the earth. Precipitation takes different forms (rain, snow or sleet).

In a natural setting when water is returned to the earth through precipitation, most of the water seeps into the soil gradually; this is called **infiltration**. Beneath the surface, the water reaches layers of porous rock and becomes **groundwater**. Groundwater gradually seeps back out to form a source of streams. When a lot of rain falls in a short period of time, the ground becomes saturated. Then some water flows over the ground and runs into streams and rivers; this is natural runoff.

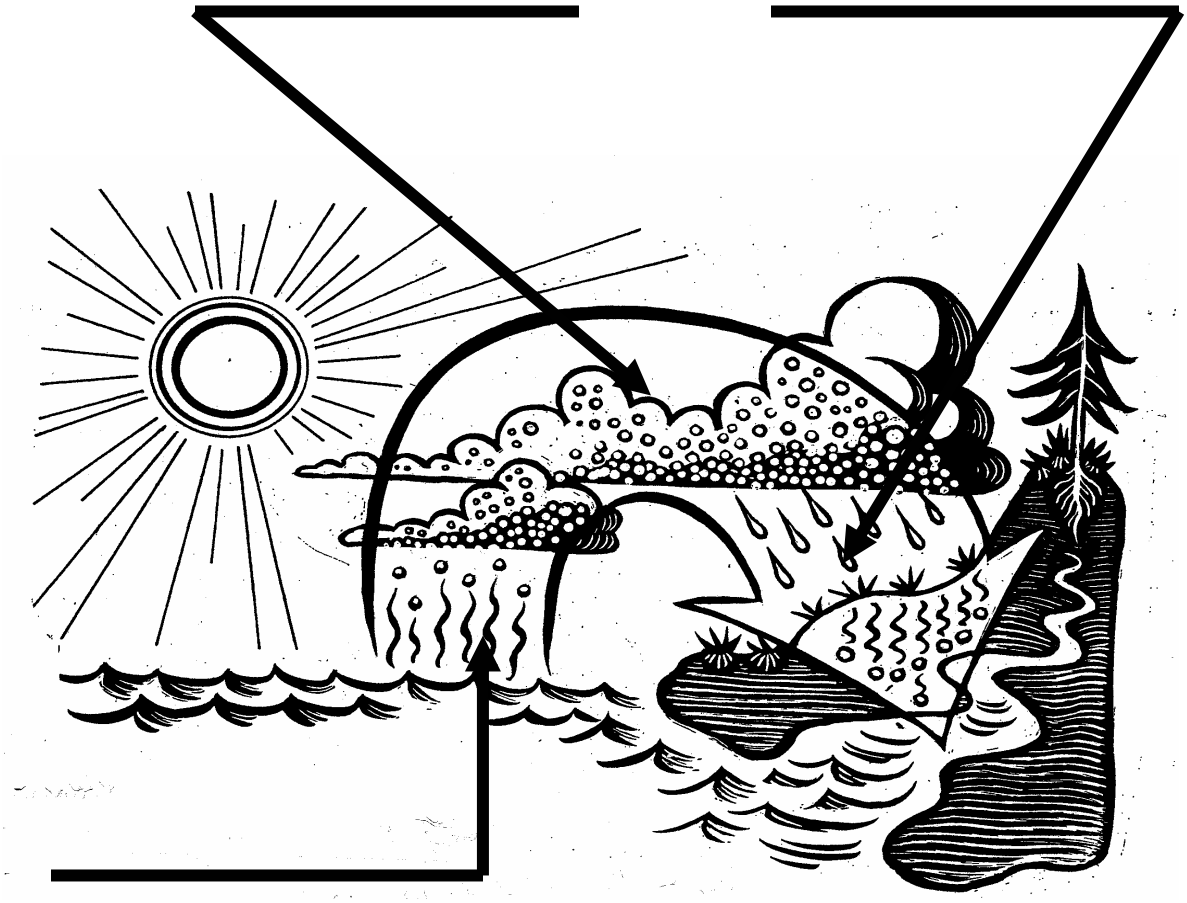
The cycle continues with more surface water evaporating into the air.

Student Page

Water Cycle Theater

Write each word on the line where it belongs:

CONDENSATION **EVAPORATION** **PRECIPITATION**



What did you learn from the water cycle theater?

Water Cycle Theater Sample Script

Water Cycle Theater Sample Skit

Roles:

- 1 Person represents a mountain.
- 1 Person represents the lake.
- 3 People represent a water molecule (2 hydrogen, 1 oxygen).

Place the mountain and body of water on opposite sides of the "stage". The water molecules should be positioned near the body of water.

Narration: (The teacher or leader can be the narrator, or one of the students may be asked to take the role. Adapt the narration to the level of students.)

I would like to introduce you to our (name of school or group) Prime Time Players who will act out the water cycle for you. On my right, we have Lake (student's name).

Near the lake we have a large molecule of water (students' name). What two elements make up water? (Hydrogen & Oxygen). How many hydrogen atoms are in a molecule? (2) The hydrogen atoms are the two outside people.

The person in the middle represents our oxygen atom. Energy bonds hold the three atoms together. Notice that they are holding hands. (If boys and girls are uncomfortable doing this together, use all girls or all boys). If they break that bond, they are no longer a molecule of water.

Now, let's use our imagination! This molecule is sitting on top of Lake (student's name). Use your imagination; we don't want to squash our lake! The sun starts to warm our body of water making our molecule move faster and spread apart but not disconnect. As they move and bump into other molecules, they "fly" off of the water into the atmosphere, up and across the sky toward the mountain (molecule should "float" on tiptoes as they move); i.e., evaporation. The higher they go, the colder it gets, making them slow down and cling together (molecule moves closer together); i.e., condensation.

Imagine more molecules forming a cloud that then bumps into the mountain (stand near mountain; don't knock the mountain over!) The cloud becomes too heavy to float, so the molecules drop to the ground (squat down if it is not practical to lay on the ground); i.e., precipitation.

The molecules are then absorbed into the ground, but we can't show this step because we would have to bury our molecule in the ground; i.e., infiltration. Some molecules can't be absorbed into the ground. These molecules flow into little streams back to the body of water (stand up and walk back toward the lake); i.e., run-off. Let's give our actors a big round of applause!!!